FIRST COURSE HANDOUT,
MODULAR COURSE (MSO 203B)
2020

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1. Pre-requisites

MTH 101 and M102 are pre-requisites. In particular knowledge from the "ODE part" in MTH 102 will be used majorly among many other things. Also recall your knowledge on limits, continuity, differentiation of one variable and two variables. Change of variable formula, Vector spaces, various function space that you have encountered as an example of vector spaces, "directional derivatives (look up for this concept if you have not seen this before)".

2. Course Objectives

Partial differential equations, are one of the fundamental tools used to mathematically model the phenomenons taking place around us. In this course we will try to understand some of these important phenomenons, among many others, like Heat flow (through heat equation), propagation of sound waves (through Wave equations), chemical concentration (via Laplace equation). Getting explicit solutions for such equations turns out to be very important, which is one of the main objectives of this course. While achieving the above mentioned objective, as a part of the process, the course would require to develop techniques like Fourier series.

Knowledge gained from MSO 203B will turn out helpful in future courses like MTH424, MTH 421, MTH656, MTH 403, EE 340, CE 351 among many others.

3. Course contents and References

- Fourier Series and its applications.
- Strum-Liouville problem and Strum-Liouville eigenvalue problem.
- Classification of PDE's. Classification for second order linear PDEs.
- Reduction to canonical form for second order linear PDEs.
- Method of Characteristics for first order PDEs.
- Wave Equation.
- Laplace Equation.
- Heat equations

References:

Topics like Fourier series, Wave equation, Heat equation, Laplace equation, Some part of Sturm Liouville theory will be from the book of "Erwin Kreyszig".

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Erwin Kreyszig: Advanced Engineering Mathematics.
I have recommended this book for IIT-K our e-library.

- I will supply necessary study material if I follow from some other references.

4. Lecture, Tutorial

• **Discussion with the Instructor: On WEDNESDAY from 9.00 am to 9.50 am.**

• **Discussion with the Tutors: On FRIDAYS from 9.00 am to 9.50 am.**

• **On request, extra discussion class with the Instructor can be arranged once in a week. I have checked that on Monday 7.00 pm to 8.00 pm all of you are free. I may use this slot.**

The lecture files will be uploaded in mooKIT platform. 30 percent of the lecture files should be uploaded on 18th October or before. The rest will be provided to you before the staring of each week and we will have discussion on that particular content on Wednesdays during discussion session.

5. mooKIT

We will use mooKIT to conduct all the discussions, announcements, tutorials, examinations. Please open your account and try to get familiar with it as soon as possible. This will help you immensely in order to get familiar with the new environment. I strongly recommend you to look at the announcement section in mooKIT regularly.

6. Examination Policy

"2 Quiz and an End semester examination."

Component Name	Weightage
Quiz 1	5 percent
Quiz 2	25 percent
End semester	70 percent

Due to unforeseen situations, examination policy may change in between semester. You will be updated about it.

7. Important Dates to remember

Officially the starting date for the course is 19th, October, 2020.

Quiz 1 on 28/ 10/20 from 9.35 am to 9.50 am (approximately).

Quiz 2 on 18/ 11/20 from 9.20 am to 9.50 am (approximately).

8. "Mock" Quiz

There will be a mock "quiz" to make you familiar with the new environment of giving examination.
On 21st, October, Wednesday, for the first 10 minutes we will conduct this mock test for you.

9. Re - examination policy

There will be no make up examination for the quiz. Re examination for the end semester examination will be as per criterion set by DOAA office.

10. Course Policies: Honesty Practices

- Discussion/collaborations for solving the assignments is encouraged. I suggest that if you face a problem, please post it in the mooKIT chat box. You will probably find a fellow friend who has the answer to your queries. I encourage, healthy discussions among all of you in the mooKIT platform.
- Refrain your self from mal-practices.

11. Tutors

Name of the students and their respective assigned Tutors, will be communicated in due course of time.

Information about the Tutors is listed below:

Dr. R K BANSAL   rkb@iitk.ac.in

Dr. ANSHU GAUR   agaur@iitk.ac.in

Dr. PRIYANKA GHOSH   priyog@iitk.ac.in

Dr. D K GIRI   judipakkumar@gmail.com

Dr. PRANAV JOSHI   jpranavr@iitk.ac.in

Dr. KALYAN MANNA   kalyan274667@gmail.com

Dr. GOVIND SHARMA   govind@iitk.ac.in